**Ans** Base quantities are the quantities which other quantities are expressed.

The examples of base quantities are leng

**(ii) Define prefixes. Write an exampl**

**Ans** Prefixes are the words or letters units such as kilo, mega, giga and mil divide 20,000 g by 1,000 to express it into

$$20,000 \text{ g} = \frac{20,000}{1,000} \text{ kg} = 20 \text{ kg}$$

**(iii) Write two uses of Physics in dail**

**Ans** In our daily life, we hardly find Physics is not involved. Consider pulleys th to lift heavy loads. Electricity is used not and heat but also mechanical energy th electric motors, etc.

**(iv) Define random motion. Write an e**

**Ans** The irregular motion of a body is motion. For example, motion of butterfly.

**(v) Define vectors and scalars.**

**Ans** The quantity which has magnitude uni is called vector.

A physical quantity which can b described by its magnitude and unit is called

**(vi) Differentiate between mass and wei**

**Ans** 1. Mass is scalar quantity but weight is ve

8- The kinetic energy of a body of mass 2 kg is 25 J. Its speed is:

(a) 5 ms⁻¹ ✓      (b) 12.5 ms⁻¹

(c) 25 ms⁻¹      (d) 50 ms⁻¹

9- Inertia depends upon:

(a) Force      (b) Net force

(c) Mass ✓      (d) Velocity

10- Which of the following is the unit of momentum:

(a) Nm      (b) Kg ms⁻²

(c) Kg ms⁻¹ ✓      (d) NS⁻¹

11- Metals are good conductor of heat due to the:

(a) Free electrons ✓

(b) Big size of their molecules

(c) Small size of their molecules

(d) Rapid vibrations of their atoms

12- The number of forces that can be added by head to tail rule:

(a) Two      (b) Three

(c) Four      (d) Any number ✓

### (Part-I)

**2.** Write short answers to any FIVE (5) questions: 10

**(i) Define base quantities. Write an example.**

**Ans** Base quantities are the quantities on the basis of which other quantities are expressed.

The examples of base quantities are length, mass, time, etc.

**(ii) Define prefixes. Write an example.**

**Ans** Prefixes are the words or letters added before SI units such as kilo, mega, giga and milli. For example, divide 20,000 g by 1,000 to express it into kg.

$$20,000 \text{ g} = \frac{20,000}{1,000} \text{ kg} = 20 \text{ kg}$$

**(iii) Write two uses of Physics in daily life.**

**Ans** In our daily life, we hardly find a device where Physics is not involved. Consider pulleys that make it easy to lift heavy loads. Electricity is used not only to get light and heat but also mechanical energy that drives fans, electric motors, etc.

**(iv) Define random motion. Write an example.**

**Ans** The irregular motion of a body is called random motion. For example, motion of butterfly.

**(v) Define vectors and scalars.**

**Ans** The quantity which has magnitude unit and direction is called vector.

A physical quantity which can be completely described by its magnitude and unit is called a scalar.

**(vi) Differentiate between mass and weight.**

**Ans** 1. Mass is scalar quantity but weight is vector quantity.

**2.** Mass does not change with change of place weight varies depending the value of g, acceleration due to gravity.

**(vii) What is meant by the banking of road? Write its benefit.**

**Ans>** The phenomenon of raising outer edge of the curved road above the inner edge is to provide necessary centripetal force to the vehicles to take a safe turn and the curved road is called banking of road. Banking of roads prevents skidding of vehicle and thus makes the driving safe.

**(viii) Define centripetal force.**

**Ans>** Centripetal force is a force that keeps a body to move in a circle.

$$F_c = \frac{mv^2}{r}$$

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**3. Write short answers to any FIVE (5) questions: 10**

**(i) Define rigid body and line of action of force.**

**Ans> Rigid body:**
A body is composed of large number of small particles. If the distances between all pairs of particles of the body do not change by applying a force then it is called a rigid body.

**Line of action of a force:**
The line along which a force acts is called the line of action of the force.

**(ii) Define equilibrium. Write name of its any two states.**

**Ans>** A body is said to be in equilibrium if no net force acts on it. Its two states are:
1. Stable Equilibrium. 
2. Unstable Equilibrium.

**(iii) Define gravitational field strength.**

**Ans>** The gravitational force per unit mass is called the gravitational field strength of the Earth.

**(iv) State Newton's law of gravitation.**

**Ans** According to Newton's law of gravitation:

"Everybody in the universe attracts every other body with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres."

**(v) Write a relation to find orbital speed of artificial satellite.**

**Ans** The relation to find orbital speed of artificial satellite is given below:

$$F_c = \frac{mv_o^2}{r_o} \qquad (i)$$

and $\qquad F_c = w' = mg_h \qquad (ii)$

Comparing

$$mg_h = \frac{mv_o^2}{r_o}$$

$$v_o^2 = g_h \, r_o$$

$$v_o = \sqrt{g_h \, r_o} \qquad (iii)$$

as $\qquad r_o = R + h$

$$v_o = \sqrt{g_h \, (R + h)} \qquad (iv)$$

$$R + h \approx R$$

$$g_h \approx g$$

$$\boxed{v_o = \sqrt{g R}}$$

**(vi) Define work and its SI unit.**

**Ans** "The product of force and displacement in the direction of force is called work."

Its SI unit is joule (J).

**(vii) Define efficiency, also write relation to find it.**

**Ans** **Efficiency:**

Efficiency of a system is the ratio of required form of energy obtained from a system as output to the total energy given to it as input.

**Relation:**

$$\text{Efficiency} = \frac{\text{Required form of output}}{\text{Total input energy}}$$

**(viii) Write down the two disadvantages of fossil fuels.**

**Ans** Two disadvantages of fossil fuels are given below:

1. Fossil fuels release harmful waste products which pollute the environment.

2. Fossil fuel release the toxic substance that can cause serious health problems such as headache, tension, nausea, allergic reactions, irritation of eyes, nose and throat, asthma, lungs cancer, heart diseases and even damage to brain, nerves and other organs of our body.

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**4. Write short answers to any FIVE (5) questions: 10**

**(i) What is meant by elasticity?**

**Ans** The property of a body to restore its original size and shape as the deforming force ceases to act is called elasticity.

**(ii) State Archimedes Principle.**

**Ans** Archimedes Principle states that:

"When an object is totally or partially immersed in a liquid, an upthrust acts on it equal to the weight of the liquid it displaces."

**(iii) What is difference between stress and strain?**

**Ans** **Stress:**

The force acting on unit area at the surface of a body is called stress. SI unit of stress is Newton per square meter ($Nm^{-2}$).

**Strain:**

When stress acts on a body, it may change its length, volume or shape. A comparison of such a change caused by the stress with original length, volume or shape is called strain. It has no SI unit.

**(IV)** **Define latent heat of fusion.**

**Ans** Heat energy required to change unit mass of substance from solid to liquid state at its melting point without change in its temperature is called its latent heat of fusion.

**(v)** **How does heating affect the motion of molecules of a gas?**

**Ans** When a body is heated, the kinetic energy of molecules increases, so the average distances between the molecules increase. Thus, the motion of molecules of gas increases on heating.

**(vi)** **What is difference between land breezes and sea breezes?**

**Ans** Land and sea breezes are the result of convection. The air above land gets hot and rises up. Cold air from the sea begins to move towards the land. It is called sea breeze.

At night, the land cools faster than the sea. Therefore, air above the sea is warmer, rises up and the cold air from the land begins to move towards the sea. It is called land breeze.

**(vii)** **Write any two uses of convection currents.**

**Ans** Two uses of convection currents are:

1. Convection currents set up by electric, gas or coal heaters help to warm our homes and offices.
2. Land and sea breezes are also examples of convections currents.

**(viii)** **Define radiation.**

**Ans** Radiation is the mode of transfer of heat from one place to another in the form of waves called electromagnetic waves.

**Note: Attempt any TWO (2) questions.**

**Q.5.(a)** Derive the first equation of motion with the help of speed-time graph. **(4)**

**Ans** Speed-time graph for the motion of a body is shown in the following figure. Slope of line AB gives the acceleration a of a body.
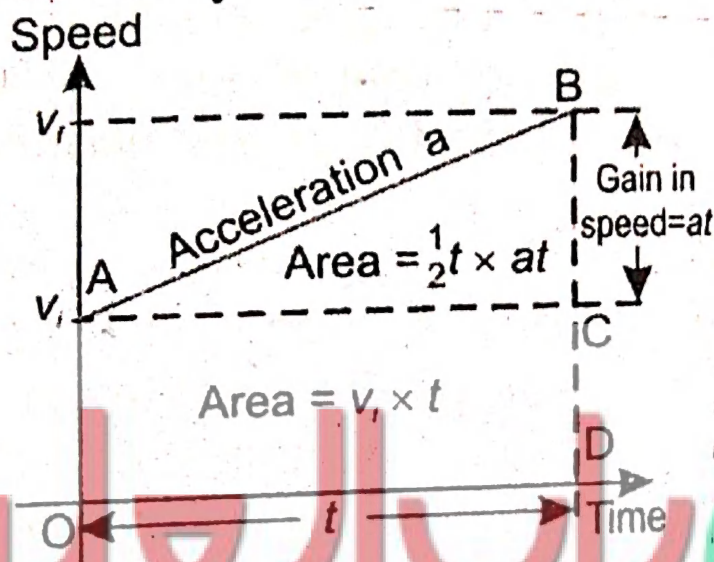


Fig. Speed-time graph. Area under the graph gives the distance covered by the body.

Slope of line AB $= a = \dfrac{BC}{AC} = \dfrac{BC - CD}{OD}$

as $BD = v_f$, $CD = v_i$ and $OD = t$

Hence $a = \dfrac{v_f - v_i}{t}$

or $v_f - v_i = at$

$\therefore \quad v_f = v_i + at$

**(b)** How much time is required to change 22 Ns momentum by a force of 20 N? **(5)**

**Ans** $\Delta P = 22$ Ns

$F = 20$ N

$t = ?$

$F = \dfrac{\Delta P}{t}$

$$t = \frac{22}{20}$$

$$t = 1.1 \text{ sec.}$$

## Q.6.(a) Explain electrical energy and sound energy.

**Ans Electrical Energy:**

Electricity is one of the widely used form of energy. Electrical energy can be supplied easily to any desired place through wires. We get electrical energy from batteries and electric generators. These electric generators are run by hydro power, thermal or nuclear power.

**Sound Energy:**

When you knock at the door, you produce sound. Sound is a form of energy. It is produced when a body vibrates; such as vibrating diaphragm of a drum, vibrating strings of a sitar and vibrating air column of wind instruments such as flute pipe etc.

**(b)** A nut has been tightened by a force of 200 N using 10 cm long spanner. What length of a spanner is required to loose the same nut with 150 N force? (5)

**Ans** Data          $F_1 = 200 \text{ N}$

$r_1 = 10 \text{ cm} = 0.1 \text{ m}$

$r_2 = ?$

$F_2 = 150 \text{ N}$

Formula          $\tau_1 = \tau_2$

$$200 \times 0.1 = 150 \times r_2$$

$$\frac{200 \times 0.1}{150} = r_2$$

$$0.133 \text{ m} = r_2$$

$$13.3 \text{ cm} = r_2$$

Q.7.(a) Define evaporation, also write the various factors on which rate of evaporation depends.

(4)

**Ans** Evaporation:

Evaporation is the changing of a liquid into vapours (gaseous state) from the surface of the liquid without heating it.

**Factors of the Evaporation of liquid:**

**Temperature:**

Why wet clothes dry up more quickly in summer than in winter? At higher temperature, more molecules of a liquid are moving with high velocities. Thus, more molecules escape from its surface. Thus, evaporation is faster at high temperature than at low temperature.

**Surface Area:**

Why water evaporates faster when spread over large area? Larger is the surface area of a liquid, greater number of molecules has the chance to escape from its surface.

**Wind:**

Wind blowing over the surface of a liquid sweeps away the liquid molecules that have just escaped out. This increases the chance for more liquid molecules to escape out.

**Nature of the Liquid:**

Does spirit and water evaporate at the same rate? Liquids differ in the rate at which they evaporate.

**b)** A wooden cube of sides 10 cm each has been dipped completely in water. Calculate the upthrust of water acting on it.

**Ans** Length of side $L = 10$ cm $= 0.1$ m

Volume $V = L^3 = (0.1 \text{ m})^3 = 1 \times 10^{-3} \text{ m}^3$

Density of water $\rho = 1000$ kgm$^{-3}$

Upthrust of water $= \rho g V$

$= 1000 \text{ kgm}^{-3} \times 10 \text{ ms}^{-2} \times 1 \times 10^{-3} \text{ m}^3$

$= 10$ N

Thus, upthrust of water acting on the wooden cube is 0 N.